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United States Coast Guard

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NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 7-99

Subj: YEAR 2000 (Y2K) RISK ASSESSMENT AND MITIGATION POLICY FOR VESSELS AND MARINE FACILITIES

1. PURPOSE. This Circular provides guidance regarding the Coast Guard's policy on ensuring maritime safety during the year 2000 (Y2K) date change. The Coast Guard has established temporary regulations that require owners and operators of certain vessels and marine facilities to report Year 2000 (Y2K) preparedness information via the submission of questionnaires. The responses in the questionnaires will help Captains of the Port (COTPs) and Officers in Charge, Marine Inspection (OCMIs) assess vessel and marine facility preparedness for potential Y2K-related malfunctions of equipment and systems. The assessments will help the COTPs and OCMIs identify potentially hazardous situations during peak Y2K risk periods and enable them to take appropriate measures to promote port safety and environmental protection. The policy described in this circular has been based in large part on the existing legal and regulatory authority assigned to individual COTPs. While we acknowledge that a national, uniform policy from the Coast Guard is not only expected but desired, it is also understood that adapting and responding to unusual circumstances is best accomplished at the port level. With this in mind, the Coast Guard has attempted to maintain a balance between the need for national consistency and the need for local flexibility in the development of its policy and guidance.

2. DIRECTIVES AFFECTED. None.

3. APPLICABILITY.

   a. The following vessels and marine facilities are subject to the requirements described in this circular and the associated temporary regulation:

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	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
A																										
B		2	10		1			1						132	1		5	1								30
C					*							1	*	*												
D	1	1		1*							1	*														
E														2	2											
F	1	1									1															
G																										
H																										

NON-STANDARD DISTRIBUTION: (See page 12)

1. vessels owned in the United States (i.e. any vessel documented or numbered under the laws of the United States; and any vessel owned by a citizen of the United States that is not documented or numbered by any nation);

2. foreign flag vessels operating on waters subject to the jurisdiction of the U.S. between August 1, 1999 and March 31, 2000;

3. vessels owned in the United States and foreign flag vessels engaged in lightering operations in the marine environment as defined under 33 CFR 156;

4. vessels inspected under Chapter 33 of Title 46 United States Code; and

5. marine facilities as defined in 33 CFR 160.309

b. The following vessels and marine facilities are exempted from the requirements described in this circular and the associated temporary regulation:

1. recreational vessels under 46 USC 4301 *et seq.*;

2. public vessels;

3. uninspected commercial fishing vessels;

4. uninspected barges;

5. foreign flag vessels engaged in innocent passage;

6. uninspected passenger vessels; and

7. marine facilities directly operated by the Department of Defense or under the authority of the Department of the Interior.

4. BACKGROUND.

a. Our society's dependence on automation and computer technology is increasing exponentially. The maritime industry incorporates automation and computer technology into almost every aspect of its business operations. Automation is used for many shipboard systems such as main propulsion, boilers, auxiliary systems, power generation, position fixing navigation systems, communications, radar, steering systems, cargo systems, and bilge/ballast controls. Automation is also used at marine facilities on cranes, on shore side equipment, and in loading and unloading operations. Current regulations for equipment and systems testing do not address the potential technological malfunctions associated with the Year 2000 (Y2K) problem that could disrupt maritime operations.

b. What is the Y2K problem? The Y2K problem stems from the widespread computer industry practice of using 2 digits instead of 4 to represent the year in databases, software

applications, and hardware microchips. Certain systems will face difficulty in the year 2000 when that year is represented as "00." Unable to differentiate "00" from the year 1900, computer programs and systems aboard ships and at port facilities could malfunction or completely shut down.

c. How might the Y2K problem affect the maritime industry?

1. Computer programs for engine automation systems that send critical operating signals are good examples of the Y2K problem. If these programs misread "00" as the year 1900 instead of 2000, they may misinterpret that 100 years have passed and respond with an inappropriate action or a series of inappropriate actions, creating a domino effect, that could shut down systems. Temporary loss of main engine operation or steering at sea on a calm day with no other ships in sight may only prove inconvenient. However, the unexpected loss of a ship's propulsion in a narrow or crowded waterway could result in a serious casualty.

2. Marine facilities are also at risk from Y2K-related problems. Systems that use time as a function of measurement such as fire detection systems, cargo tracking software, process flow controls (oil, gas, and chemical), temperature controls and alarms are most vulnerable. For example, system sensors could cause an automatic shutdown response that could in turn trigger some other fail-safe response. In such a case, a release of hazardous materials could occur when overpressure safeguards react to the sudden closure of a valve against the flow of gas or liquid.

3. The risk period for Y2K-related equipment and system failures and malfunctions is not limited to January 1, 2000. Similar problems are associated with other dates, in particular September 9, 1999 and February 29, 2000.

d. Why are September 9, 1999 and February 29, 2000 dates of concern?

1. September 9, 1999 is a date of concern because of the common programming practice of using 9999 or simply 99 to mark the end of a file or a record that should be archived or purged. Both sets of digits could also legitimately represent September 9, 1999, or the year 1999 respectively. For instance, a maritime application might prompt someone to enter 99 as a year if they want to delete the corresponding file. Software programs may need revisions to facilitate deletion requests differently.

2. February 29, 2000 is a date of concern because of how leap years are determined. Our calendars reflect leap years occurring every four years; however, leap years do not adhere to a strict four-year cycle. As a result, century years generally are not leap years (i.e. year 1800 or 1900). However, exceptions apply to century years evenly divisible by 400, such as February 29, 2000. Problems could occur in computers not properly programmed to accept this date. If a microprocessor reads 00 as the year 1900, it will fail to accept the 29th of February because 1900, unlike 2000, was not a leap year. Leap years have already presented a problem. In 1996, the presence of a leap year created a complete loss of process control computers at a large aluminum

smelter in New Zealand because the programs failed to accept the 366th day ("Ship 2000"; *Lloyd's Register Articles*; March 5, 1999).

5. DISCUSSION.

a. The Coast Guard has been assessing Y2K-related risks, both internally and externally. On December 4, 1998, we published a request for comments in the Federal Register [63 FR 67166] seeking comments on how best to address the Y2K problem aboard vessels, at port facilities, and at marine terminals. In the request for comments, we stated that the focus was not on mandating new industry requirements. Rather, the goal was to use existing authority to address Y2K-related risks. The request for comments was summarized in the Marine Safety Newsletter and posted on the Coast Guard Internet site. Thirty-nine responses to this request were received. In January of 1999, a meeting of COTPs was held in which they stressed the need for a Y2K risk assessment tool. Based on the substance of the comments and the COTPs' need for a risk assessment tool, we decided to issue a temporary regulation requiring the submission of information needed to use the Y2K risk assessment tool.

b. The international nature of shipping presents additional challenges. At the behest of the U.S. Coast Guard and the United Kingdom Maritime and Coastguard Agency, a meeting was held in March 1999 at the International Maritime Organization (IMO) Headquarters to consider issues relating to the Y2K problem, promote international awareness and knowledge sharing, identify and refine preparedness actions, and promote contingency planning. By the conclusion of the meeting, the participants had unanimously agreed to two documents relating to the mitigation of Y2K-related problems: 1) *The Year 2000 Code of Good Practice* and 2) *Key elements of Y2K contingency plans for ships, ports and terminals*. The IMO issued these two documents on March 5, 1999, as annexes to IMO Circular letter No. 2121. The IMO circular letter is attached to this circular as Enclosure (2).

c. Contained in *the Year 2000 Code of Good Practice* are questionnaires on Y2K preparedness for vessels and marine facilities. Using *the Year 2000 Code of Good Practice* and its questionnaires as a base, the Coast Guard began developing a Y2K risk assessment tool that would meet the Coast Guard's needs identified during the January 1999 meeting of COTPs. In doing so, the Coast Guard identified the need for additional information to supplement that provided in the original questionnaires developed at the IMO. The resulting United States Coast Guard (USCG) questionnaires are based on two of the original questionnaires found in *The Year 2000 Code of Good Practice*; however, they have U.S.-specific instructions and include U.S. supplements.

d. The Coast Guard is focusing its Y2K risk assessment and mitigation efforts on the following three peak risk periods:

1. Between midnight (2400 hours local time) September 7, 1999 and midnight (2400 hours local time) September 9, 1999 (48 hours);

2. Between midnight (2400 hours local time) December 30, 1999 and midnight (2400 hours local time) January 1, 2000 (48 hours); and

3. Between midnight (2400 hours local time) February 27, 2000 and midnight (2400 hours local time) February 29, 2000 (48 hours).

e. Although the last Y2K peak risk period ends at midnight on February 29, 2000, the temporary regulation will remain effective through March 31, 2000. This extra "period of vigilance" provides us with the necessary flexibility to address potential Y2K problems that have not yet been identified.

6. PROCEDURES.

a. Y2K Awareness. The Coast Guard has taken all available opportunities to disseminate information regarding the Y2K problem to the maritime industry and will continue these efforts.

1. During the summer of 1998 Coast Guard inspectors and boarding officers distributed a tri-fold brochure entitled "Year 2000 Questions for the Marine Industry" to vessels and marine facilities during the course of their routine inspections; and

2. Maritime industry-sponsored and Coast Guard-supported Y2K workshops have been held in numerous ports to assist with the distribution of information on Y2K preparedness.

b. Risk Assessment and Mitigation.

1. Submission of Y2K Preparedness Information. The ability to make timely and informed assessments and decisions is required to ensure the greatest success in our efforts to mitigate the effects of Y2K problems on port safety and the marine environment. To have that ability, it is imperative that COTPs have all relevant information regarding the risk and consequences of a Y2K-related problem occurring in their ports. To collect that information, the Coast Guard has developed two questionnaires, which were published in the temporary regulation. Copies will be available from the local COTP or may be downloaded via the Internet at www.uscg.mil/hq/g-m/y2k.htm. In addition, the questionnaires may be completed directly online at the same Internet address.

(i) The Vessel Questionnaire includes the IMO Year 2000 questionnaire 2 from *The Year 2000 Code of Good Practice* and United States Supplement 1.

(ii) The Marine Facility Questionnaire includes IMO Year 2000 questionnaire 3 from *The Year 2000 Code of Good Practice* and United States Supplement 2.

2. Deadlines for Submission of Y2K Preparedness Information.

(i) Marine facilities and vessels owned in the United States must submit the required information no later than August 1, 1999.

(ii) Foreign flag vessels must submit the required information no later than 24 hours in advance of their first arrival in the U.S. after August 1, 1999.

3. Coast Guard Risk Assessment and Mitigation. COTPs/OCMIs will use existing regulatory authority to control vessel movement or restrict facility operations, if necessary, during the specified Y2K peak risk periods. COTPs/OCMIs will use the submitted Y2K preparedness information, in addition to safety, cargo, weather, and navigation information to evaluate the risk posed by the vessel or marine facility operating in U.S. ports during Y2K peak risk periods. In the interest of national consistency, the Coast Guard developed a structured risk assessment process through the creation of the Y2K Risk Assessment Guidelines. These guidelines, which include a risk assessment matrix, are attached to this circular as Enclosure (1). COTPs/OCMIs will complete the risk matrix by assigning points for various risk factors or deducting points where risk is lowered by the implementation of measures by vessel and facility owners/operators to mitigate Y2K risk. COTPs/OCMIs will use the risk matrix results as one of the factors for determining whether it is appropriate to impose controls on vessel movements or vessel/facility cargo transfer operations.

4. Recommended Actions for Vessel/Facility Owners and Operators. In addition to the required actions contained in the temporary regulation and described in paragraph 3, vessel and marine facility operators are encouraged to utilize the following recommendations to mitigate the risk posed by Y2K-related problems:

(i) Voluntary assessments of their vessels and marine facilities for Y2K related problems should be conducted and corrective actions implemented at the earliest opportunity. *The Year 2000 Code of Good Practice* in Enclosure (2) provides information vessel and marine facility operators should consider to address Y2K risk, including the development of contingency plans.

(ii) Y2K documents supporting the responses on the Y2K preparedness questionnaires should be available on board vessels and at marine facilities. All information should provide sufficient details that address the critical issues set forth in the required Coast Guard Y2K preparedness questionnaires. Vessel and marine facility operators should ensure that all key personnel are familiar with their duties under a Y2K contingency plan and can describe or demonstrate those duties to the Coast Guard inspector or boarding officer. However, vessel and marine facility operators should not submit copies of contingency plans or other Y2K supporting documentation to COTPs.

7. COAST GUARD PORT CONTINGENCY PLANNING.

a. In coordination with Area Commanders and District Commanders, each COTP is evaluating the port area in their zone and developing a port plan that evaluates and addresses contingencies to follow in the event of Y2K-related system failures, such as:

1. risks from designated waterfront facilities or facilities that handle cargoes of particular hazard in the port area;

2. risks posed by vessels that lose propulsion, steering or the ability to navigate in restricted visibility;

3. loss of communications;

4. loss of navigational aids;

5. loss of Vessel Traffic Management (VTS) Services; and/or

6. loss of shore-based port emergency services.

b. COTPs may consider establishing regulated navigation areas or safety zones dependent on the level of risk to a portion of or the entire port area under COTP jurisdiction. COTPs may require vessels operating in these areas to report their movements or hazardous material transfers as part of the locally imposed controls under their existing regulatory authority. For unregulated vessel movements and operations (those where there is no requirement to provide advance notice), District Commanders and COTPs should develop local reporting requirements as needed for the three specified Y2K peak risk periods in cooperation with the local maritime industry.

8. ACTION.

a. COTPs and OCMIs will:

1. Use the policy contained in this circular as a guide to determine what actions, if any, should be taken under their existing legal and regulatory authority to restrict or control the movement of vessels that pose a risk to safety or the environment during the specified Y2K peak risk periods. These actions may take many forms that can include, but are not limited to, the use of COTP orders and establishment of regulated navigation areas and/or safety zones.

2. Ensure that the policy contained in this NVIC and its enclosures is made available to the appropriate individuals in the maritime industry within their geographic area of responsibility.

3. Ensure that applicable vessels and marine facilities comply with the temporary regulation that requires reporting of Y2K preparedness information. Vessel and marine facility operators neglecting to submit the required Y2K preparedness

questionnaires by the specified due date or who choose not to comply with the reporting requirements of the temporary regulation are subject to control actions and/or penalties as provided for under Title 33, United States Code, Chapter 25.

4. Ensure the accuracy of the Y2K information reported to the Coast Guard, as needed, by conducting on-site verification during all routine inspections and boardings until 31 March 2000. At their discretion, COTPs and OCMIs may conduct vessel boardings and marine facility visits for the sole purpose of Y2K information verification.

5. Verify that periodic operational testing, arrival/departure tests and inspections of safety, navigation and pollution prevention equipment/systems are being conducted on board vessels as required by international and domestic regulations. These tests are designed to detect malfunctions or failures of systems regardless of the cause. NOTE: The Coast Guard recognizes that operational testing does not provide advance warning of a Y2K problem; however, these tests are valuable in detecting potential Y2K problems upon the initial start up of systems that may have been inactive through the Y2K peak risk periods.

b. Commandant (G-MOC) will establish a national reporting and information management system. This system will perform two functions. First, it will handle receipt and storage of the information submitted in Y2K preparedness questionnaires. Second, it will provide an interface to COTPs through which they may view the information contained in the questionnaires, complete the risk assessment matrix, and obtain reports of the assessment results.

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Assistant Commandant for
Marine Safety and Environmental Protection

Encl: (1) Y2K Risk Assessment Guidelines
(2) IMO Circular letter No. 2121

Non-Standard Distribution:

C:e New Orleans (90); Hampton Roads (50); Houston-Galveston, San Francisco Bay, Puget Sound (40); Philadelphia, Port Arthur, Honolulu (35); Miami, Mobile, Long Beach, Morgan City, Portland OR (25); Jacksonville (20); Boston, Portland ME, Charleston, Anchorage (15); Cleveland (12); Louisville, Memphis, Paducah, Pittsburgh, St. Louis, Savannah, San Juan,

Tampa, Buffalo, Chicago, Detroit, Duluth, Milwaukee, San Diego, Anchorage, Juneau, Valdez (10); Providence, Huntington, Wilmington, Corpus Christi, Toledo, Guam, Sault Ste. Marie (5).

C:m ACTEUR, FEACT, National Maritime Center (2).

C:n New York (70); Baltimore (45).

D:d Except Moriches and Grand Haven.

CG Liaison Officer MILSEALIFTCOMD (Code N-7CG), CG Liaison Officer RSPA (DHM-22), CG Liaison Officer MARAD (MAR-742), CG Liaison Officers JUSMAGPHIL, CG Liaison Officer World Maritime University, CG Liaison Officer ABS, Maritime Liaison Officer Commander U.S. Naval Forces Central Command (1)

NOAA Fleet Inspection Officer (1)

U.S. Merchant Marine Academy (1)

Y2K RISK ASSESSMENT GUIDELINES

INTRODUCTION

These Y2K Risk Assessment Matrix Guidelines are intended as supplementary information to policy contained in NVIC 6-99 and the requirements in the temporary regulation for Y2K preparedness reporting. They were developed as a non-binding tool for Captains of the Port (COTPs) to make determinations as to the appropriate level of control for vessels and marine facilities posing Y2K-related risks to themselves, the port and the marine environment.

The methodology used in these guidelines is based on that recommended in the annexes of IMO Circular Letter No. 2121. Annex 1, *The Year 2000 Code of Good Practice*, identifies a process through which information necessary for dealing with possible Y2K-related problems may be exchanged between vessels and port authorities/terminal operators. It includes questionnaires that can be used to facilitate the exchange of information. Annex 2, *Key elements of Y2K contingency plans for ships, ports and terminals*, recommends the development of an assessment process including the development of "failure scenarios" and an "evaluation of risk." Using these recommendations as a starting point, the Coast Guard has developed a process for assigning points to identified risk factors in a matrix. The resulting score in that matrix will be used to help determine whether the operation of a specific vessel or marine facility poses a low, medium, or high risk, and whether possible control actions need to be implemented. The Coast Guard also considered comments received from the maritime industry and the COTPs during the development of these guidelines. In the end, the goal of the Coast Guard was to develop guidelines that would prove useful in the assessment and mitigation of risks associated with Y2K-related problems and ensure nationwide consistency in COTP Y2K risk assessment and mitigation efforts.

INTENDED USE OF THESE GUIDELINES

The overriding concern in dealing with Y2K-related issues is the same as for other Coast Guard marine safety situations – the promotion of personnel and port safety and preservation of the marine environment. These Y2K Risk Assessment Guidelines, as a nationally implemented tool, will help ensure each COTP will make consistent judgments regarding the degree of control actions to impose should a vessel or marine facility pose a Y2K-related threat. They contain a matrix that uses a universal set of criteria identified as critical to assessing the risks associated with specific vessel/marine facility circumstances. While the primary users of these guidelines are the Coast Guard COTPs, owners/operators of vessels and marine facilities are also encouraged to use them. In that respect, these guidelines could be used to help determine what actions might be taken to reduce the risks associated with Y2K-related problems in order to maintain the desired level of operational activity during peak risk periods, especially given the potential control actions that may result from the implementation and use of these guidelines by the Coast Guard.

The diversity of each port requires that control action decisions be made at the local level. For this reason, **the Coast Guard has emphasized the uniqueness of individual ports as an**

integral part of these guidelines. Relying upon the Y2K Risk Assessment Guidelines as a tool, each COTP can evaluate the appropriate level of control for the different risks they will encounter. At the same time it must be understood that these guidelines are intended to fulfill the need for a primary national standard that provides a level of consistency for assessing whether to impose controls and to what extent those controls are taken.

To address this need for a balance between the requirements of local COTPs and the need for national consistency these guidelines, including the risk assessment matrix, were developed using input from many Coast Guard units. They include elements of risk for circumstances that are region specific. They were then validated during a conference of representatives from all COTPs and Coast Guard Districts. In most cases, the Coast Guard attempted to develop objective criteria that would be applied consistently regardless of which COTP was conducting the assessment. However, it was also recognized that some criteria were subjective and would result in different outcomes depending on which COTP was conducting the assessment. For example, what is considered a "narrow" channel in one port is based on the size of the vessels that typically navigate through its particular waterways. COTPs will need to determine what is considered "wide" or "narrow" to fit the operations of their specific ports.

Therefore, while the primary goal of these guidelines is to provide a national standard upon which each COTP will base their own local efforts; it is understood that some COTPs will need to adapt them to any unique regional or port-specific circumstances associated with their COTP zones. Even so, COTPs should attempt to limit any adaptations to the minimum necessary to adequately address those port specific concerns so that the balance between the national standard and port specific concerns can be maintained.

DESCRIPTION OF THE RISK ASSESSMENT MATRIX

With information collected from the Vessel and Marine Facility Questionnaires, COTPs will use the "Y2K Risk Assessment Matrix" contained in these guidelines as a tool to help them assess potential Y2K risks associated with vessel and marine facility operations during peak risk periods. **The risk assessment matrix, however, is not meant to be a binding mechanism from which the COTP cannot deviate. It is simply one tool of many that the COTP has available for making decisions regarding maritime safety and the marine environment.**

The focus of the Coast Guard's risk assessments will be for vessels and marine facilities operating during the following three peak risk periods:

- Between midnight (2400 hours local time) September 7, 1999 and midnight (2400 hours local time) September 9, 1999 (48 hours);
- Between midnight (2400 hours local time) December 30, 1999 and midnight (2400 hours local time) January 1, 2000 (48 hours); and
- Between midnight (2400 hours local time) February 27, 2000 and midnight (2400 hours local time) February 29, 2000 (48 hours).

While the Coast Guard's Y2K risk assessment efforts will focus on the three periods of concern mentioned above, it is possible that date-sensitive or Y2K-related casualties could occur on dates other than the peak risk periods. Such incidents should be reported to the applicable COTP under existing casualty reporting requirements.

The risk assessment matrix consists of two sections that are described as follows:

Section 1: Vessel Movement.

In general, the vessel movement section identifies vessel and cargo risk factors (inspection status, cargo, vessel history, etc.) and uses these factors in conjunction with local environmental factors (time of day, weather, etc.) and the potential consequences of accidents (health and safety, environmental, etc.). In doing so, this section allows COTPs to consistently evaluate the levels of risk arising from vessel and cargo factors, environmental factors, and the probable consequences if a Y2K failure resulted in a collision, allision, grounding, or spill. There are three mechanisms that can potentially reduce that risk by addressing the above factors and consequences:

- Ship owners/operators identifying critical ship control systems and assessing them for the presence of Y2K-related problems and implementing repairs where such problems were found.

- Ship owners/operators providing the ship with a documented, tested and reviewed Year 2000 specific contingency plan that includes actions such as having personnel manually control automated systems and machinery posing Y2K-related risks.

- COTPs imposing restrictions on vessel movement using existing legal and regulatory authority. For example, such restrictions could include, but are not limited to, specifying that movement can only take place in clear visibility, during daylight, at slack water, when the wind is below a certain speed, and with a specified number of Y2K compliant tugs in attendance.

Section 2: Cargo Transfer.

The cargo transfer section considers cargo risk factors, facility history, and risk mitigating factor information obtained from questionnaires to calculate an overall risk factor. COTPs must evaluate the level of risk arising from the type of cargo being handled. The marine facility operators can mitigate that risk by implementing the same methodology used by vessel operators, i.e., assessment and correction, additional human intervention and contingency plans. In those situations where the risk has been identified as very high, the ship or facility owner/operator will need to take steps to reduce that risk if they want to move the ship or engage in cargo transfer operations in a U.S. port during the Y2K high risk periods.

INSTRUCTIONS FOR COMPLETION OF THE RISK ASSESSMENT MATRIX

Use the following steps to complete the risk assessment matrix:

1. Identify the appropriate answer for each criterion in each sub-section of Section 1.

2. Once identified, enter the number of points associated with that answer in the block to the right of the appropriate criterion. The points can be found in the brackets at the end of each answer. **Please note that the points found in the Risk Mitigating Factors Sub-Section have negative values.**

3. Once you've completed a sub-section of the matrix, sum all the points entered in the blocks to the right of the criteria for that sub-section and enter that sum in the sub-total block at the end of the sub-section.

4. Once steps 1 through 3 have been completed for all sub-sections of Section 1, enter the values of all sub-totals in the appropriate blocks provided at the end of Section 1. Calculate the total points assigned by the matrix for Section 1, remembering to subtract the points assigned in the Risk Mitigating Factors sub-section.

5. Compare the result to the point ranges provided at the end of Section 1 to help evaluate the risk the vessel poses due to Y2K-related problems and determine what control actions, if any, may be imposed.

6. If cargo transfer operations are anticipated, complete Section 2 of the matrix by completing the following steps:

   a. Identify the appropriate answer for each criterion in Section 2.

   b. Once identified, enter the number of points associated with that answer in the block provided to the right of the appropriate criterion. The points can be found in the brackets at the end of each answer. **Please note that the points found in the Cargo Handling Equipment Risk Mitigating Factors Sub-Section have negative values.**

   c. Calculate the total points assigned by the matrix for Section 2, remembering to subtract the points assigned in the Cargo Handling Equipment Risk Mitigating Factors Sub-Section.

   d. Compare the result to the point ranges provided at the end of Section 2 to help evaluate the risk associate with the cargo transfer and determine what control actions, if any, may be imposed.

USING THE RESULTS OF THE RISK ASSESSMENT MATRIX

The results from the risk assessment matrix should be used as part of the process of deciding if control action is needed. In doing so, it is recommended that:

1. The COTP should assess the likely risk in his/her zone based on geography, hydrography, probable environmental conditions, and the ships normally using the waterways. These assessments may require breaking the zone down into sub-sectors that have substantially

different conditions. It is highly recommended that these assessments be completed as early as possible and that updates be made whenever appropriate.

2 The COTP should communicate the results of his/her assessments to ship and facility owners/operators to motivate them to develop contingency plans and take appropriate risk mitigating actions. If a ship or facility owner/operator find the anticipated level of Coast Guard control recommended by the assessment results unacceptable for their affected vessel or marine facility, they should investigate other control actions to mitigate risks. Affected vessel and marine facility operators should discuss options as early as possible with the cognizant COTP.

3 The COTP should draft appropriate orders to restrict/control ship movement and cargo transfer operations based on one of two scenarios:

a. The port will be substantially low risk and restrictions will only be needed for a few, high risk operations; or

b. The port or portions thereof will be substantially high risk and permission to operate will be granted only to a few low risk operations.

The Y2K Risk Assessment Guidelines are a tool designed to analyze information from a variety of sources. Combined with the questionnaires required by the temporary regulation, they make up only one component of the entire risk assessment process. It is conceivable that a vessel or marine facility representative could reply "no" to every question on the applicable questionnaire (indicating that no Y2K preparedness actions have been taken) and the COTP, after conducting a risk assessment and classifying the vessel or facility as low risk, could allow the vessel or facility to operate without restriction during one or more peak risk periods. This would be true for the vessel or facility, regardless of its Y2K preparedness, if it was classified as low risk based on a number of other factors such as location, weather conditions, tide and current, type of cargo, vessel traffic density, etc. However, in most cases, a vessel or marine facility that demonstrates some level of Y2K preparedness should receive a better overall risk factor score than a vessel or marine facility that is not prepared for Y2K.

SECTION 1 - SHIP MOVEMENT Y2K RISK ASSESSMENT MATRIX

RISK MITIGATING FACTORS **[Note negative signs before numbers!]**

Inventory checks have been carried out to identify and categorize potential Y2K non-compliant equipment [-3] _____

Navigational equipment (including radar) has been investigated and appropriate remedial actions have been taken to repair Y2K problems found [-5] _____

Propulsion and power generation systems have been investigated and appropriate remedial actions have been taken to repair Y2K problems found [-5] _____

Cargo handling equipment has been investigated and appropriate remedial actions have been taken to repair Y2K problems found [-2] _____

The ship has a documented Y2K specific contingency plan, including competent personnel to implement it [-5] _____

During the Y2K high-risk periods, the ship's contingency plan calls for:

Two or more additional trained crew to be on board [-2] _____

Anchor detail set and anchors ready for letting go [-5] _____

Manning the engine room with engine and generator alarm systems in manual override mode [-5] _____

Setting the steering in manual mode (automatic pilot disengaged) [-5] _____

Enabling the ship to be steered mechanically at the rudderpost and manning the steering compartment [-5] _____

The ship's Y2K contingency plan has been tested and reviewed to confirm its effectiveness [-10] _____

Inspected vessel enrolled in the Streamlined-Inspection Program (SIP) or uninspected towing vessel enrolled in USCG UTVEP or AWO RCP [-3] _____

SUBTOTAL -- RISK MITIGATING FACTORS – _____

VESSEL / BARGE / CARGO RISK FACTORS **Points**

Inspection Status
- Foreign flagged commercial vessel [5]
- Uninspected U.S. commercial vessel of greater than five gross tons [3]
- Inspected U.S. vessel or uninspected U.S. commercial vessel of less than five gross tons [1] _____

Port State Control Vessel History
- Port State Control Boarding Priority I [10]
- Port State Control Boarding Priority II or III [5]
- Port State Control Boarding Priority IV or U.S. vessel [1] _____

Vessel/Barge History
- More than one violation / spill in the past year [5]
- One violation / spill in the past year [3]
- No violations / spills in the past year [1] _____

Cargo Type
- Cargo of particular hazard (33 CFR 126) or Liquefied Hazardous Gas (LHG) carrier [20]
- Bulk HAZMAT carrier (includes chemicals and NLS as well as solid and bulk HAZMAT) [15]
- Bulk oil, single hull [10]
- Bulk oil, double hull [5]
- 150 or more passengers [15]
- 7 to 149 passengers [10]
- 1 to 6 passengers (does not include cargo ships carrying persons in addition to the crew [5]
- Other (not one of the above) [1] _____

Vessel Navigation / Draft Characteristics
- Vessel constrained by draft to preferred navigation channels or towing vessel pushing 9 or more barges in line ahead [5]
- Vessel 1600GT or more but not constrained by draft to preferred navigation channels [3]
- Vessel less than 1600GT and not pushing 9 or more barges in line ahead and can operate without restrictions outside preferred channels) [1] _____

SUBTOTAL -- VESSEL / CARGO RISK FACTORS _____

ENVIRONMENTAL RISK FACTORS

Time of Day
- Night – less than ¾ moon or skies overcast [5]
- Night – more than ¾ moon and clear sky [3]
- Daylight [0] _____

Sustained Wind Conditions
- High winds (28 knots or more) [5]
- Moderate winds (11 – 27 knots) [3]
- Low / no winds (10 knots or less) [0] _____

Visibility
- Poor visibility (less than 2 miles) [5]
- Fair visibility (2 – 5 miles) [3]
- Good visibility (greater than 5 miles) [0] _____

Tide / River Current Strength
- Strong current (greater than 5 knots) [5]
- Moderate current (2 – 5 knots) [3]
- Low current (less than 2 knots) [0] _____

Tide / River Current Direction
- Strong / moderate currents cross channel or make turns difficult [5]
- Strong / moderate currents run parallel to channel [3]
- No strong or moderate currents [0] _____

Ice Conditions
- Ice conditions preclude vessel movement without icebreaker escort [5]
- Navigation constrained by ice to defined channels [3]
- Navigation not affected by ice conditions [0] _____

Bottom Type
- Hard or rocky bottom lines the edges of preferred navigation channels [5]
- Sand, shale, some rock outside the preferred navigation channels [3]
- Mud bottom with no obstructions or deep water outside preferred navigation channels [0] _____

Channel Width
- Narrow (one way traffic required or meeting / overtaking only with special arrangements) [5]
- Medium (meeting / overtaking not constrained but traffic separated by less than 500 yards) [3]
- Wide (meeting / overtaking traffic separated by more than 500 yards) [0] _____

Channel Straightness

Winding (one or more turns greater than 45 degrees) [5]

Moderate (one or more turns greater than 15 degrees but no turns greater than 45 degrees) [3]

Fairly straight (no turns greater than 15 degrees) [0] _____

Waterway Complexity

Converging waterways with crossing traffic [5]

Converging waterways but no crossing traffic [3]

No converging waterways and no crossing traffic [0] _____

SUBTOTAL -- ENVIRONMENTAL RISK FACTORS _____

CONSEQUENCES OF COLLISION, ALLISION, OR GROUNDING **Points**

Impact on Public Health and Safety
- Loss of life [10]
- Human injuries but loss of life unlikely [5]
- No human injuries [0]

_____

Impact on Local Economy
- Adverse impact on large dependent community [5]
- Large human population in the area but no adverse affects [3]
- Small human population that will not be affected [0]

_____

Oil / HAZMAT Discharge or Release (*as defined in the National Contingency Plan, 40 CFR 300.5*)
- Major oil spill / HAZMAT discharge or release [10]
- Medium oil spill / HAZMAT discharge or release [5]
- Minor oil spill / HAZMAT discharge or release [2]
- No oil spill / HAZMAT discharge or release [0]

_____

Impact on Local Environment
- Highly sensitive area (endangered species affected) [10]
- Moderately sensitive area (wetlands or fisheries affected) [5]
- Not an environmentally sensitive area [0]

_____

SUBTOTAL -- CONSEQUENCES FACTORS _____

VESSEL / CARGO RISK FACTORS POINTS + _____

ENVIRONMENTAL RISK FACTORS POINTS + _____

CONSEQUENCES FACTORS POINTS + _____

RISK MITIGATING FACTORS – _____

TOTAL POINTS _____

Ranges of Suggested Control Actions		
15 points or less	=	**Good candidate for granting free movement without restriction.**
16 to 55 points	=	**Consideration should be given to vessel movement with some appropriate controls to be established by the COTP (e.g., VTS, tug escort, time of day, speed, one way traffic)**
56 points or more	=	**Strong consideration should be given to stringent vessel movement control during defined Y2K high-risk periods**

SECTION 2 - CARGO TRANSFER Y2K RISK ASSESSMENT

CARGO RISK FACTORS **Points**

(for Ship to Shore or Shore to Ship Cargo Transfers)

Cargo of particular hazard (33 CFR 126) or LHG (33 CFR 127) [6]
Bulk liquid HAZMAT cargo [5]
Bulk liquid petroleum products [4]
Bulk dry HAZMAT cargo [3]
General cargo (not bulk, not containerized) containing HAZMAT [2]
Containerized cargo containing HAZMAT (49 CFR 172) [1]
Cargo without HAZMAT [0] _____

More than one violation / spill in the past year [3]
One violation / spill in the past year [1]

FACILITY HISTORY RISK FACTORS

No violations / spills in the past year [0] _____

CARGO HANDLING EQUIPMENT RISK MITIGATING FACTORS

(including pipe / hose valve flow controls)

Inventory checks have been carried out to identify and categorize potential Y2K non-compliant equipment [-1] _____
Cargo handling equipment has been investigated and appropriate remedial actions have been taken to repair Y2K problems found [-1] _____
There is no serious doubt about the availability of any supply, utility, or service that is critical to safety [-1] _____
The facility has an operational contingency plan in place to cope with unforeseen Y2K equipment malfunctions [-1] _____
The facility's Y2K contingency plans have been tested and reviewed to confirm their effectiveness [-1] _____

TOTAL POINTS _____

1 point or less	=	**Good candidate for few or no restrictions on cargo transfer operations**
2 or 3 points	=	**Consideration should be given to cargo transfer operations with controls to be established by the COTP (e.g., maximum pumping pressure, time of day, number of personnel in attendance)**
4 points or more	=	**Strong consideration should be given to stringent restriction of cargo transfer operations during the defined Y2K high-risk periods**

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Ref. T1/3.01

Circular letter No.2121
5 March 1999

To: IMO Members and other Governments
United Nations and specialized agencies
Intergovernmental organizations
Non-governmental organizations in consultative status

Subject: **Meeting on year 2000 (Y2K) problems**

Upon the initiative of the United States Coast Guard and the United Kingdom Maritime and Coastguard Agency, a meeting was held at the Headquarters of the Organization on 3 and 4 March 1999 to consider issues relating to the year 2000 (Y2K) problem*, promote international awareness and knowledge sharing, identify and refine preparedness actions and promote contingency planning.

Invited to the meeting were representatives of non-governmental industry organizations. Their selection was based upon their particular awareness of the critical Y2K challenges facing the maritime community and also because of their special ability to effectively communicate, through their membership, with ships and ports around the world.

As a result of its deliberations, the meeting unanimously agreed to:

.1 The Year 2000 Code of Good Practice (annex 1); and

.2 Key elements of Y2K contingency plans for ships, ports and terminals (annex 2).

Member Governments are invited to bring the contents of this circular to the attention of shipowners, ship operators, shipping companies, seafarers, customs, port authorities, port and offshore terminals, vessel traffic service operators, maritime pilots, hydrographers, classification societies, maritime communication authorities, shippers, charterers, insurance organizations and all other parties concerned, for information and action as appropriate.

***

* Of relevance are:

- MSC/Circ.804, of 9 June 1997, on Impact of the Year 2000 on software systems;
- MSC/Circ.868, of 27 May 1998, on Addressing the Year 2000 problem;
- MSC/Circ.894, of 17 December 1998, on Addressing the Year 2000 problem: Co-operation within mandatory ship reporting systems;
- MSC/Circ.891, of 21 December 1998, on Guidelines for the on-board use and application of computers; and
- resolution A.852(20) on Guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

ANNEX 1

THE YEAR 2000 CODE OF GOOD PRACTICE

Introduction

1 The Year 2000 problem, sometimes referred to simply as Y2K, is the term used to describe the potential electronic date recognition (EDR) failure of information technology systems prior to, on or after 1 January 2000. The potential exists because of the widespread practice of using two digits, not four, to represent the year in computer databases, software applications and hardware chips. For example, difficulty will arise in the year 2000 when machines may be unable to differentiate it from the year 1900. As a result, microchip-based systems may function incorrectly, or not at all.

2 The equipment involved may be as simple as a clock as sophisticated as the monitoring and control system for the main engine plant; or as complex as a port's vessel traffic system. All affected parties must assess the extent of the problem in their operations, prioritize potentially non-complaint units/systems and decide on the correct action. Depending on the system, equipment or software involved the correct action may be to repair it, replace it, or use alternative systems or manual operations.

3 Awareness of the nature and extent of the problem is critical in correcting it. The problem does not reside merely in mainframe or personal computer systems. It also affects programmes embedded in any microchip based system. One of the first steps in addressing the problem is to conduct an inventory of equipment that may be affected in order to establish whether or not software and hardware are Year 2000 compliant. Failure to identify and correct systems that could be affected by the Year 2000 problem could result in serious safety problems, such as unexpected shutdown of the main engines and ships' navigation systems or a breakdown in communications, or loss of shore utility services.

4 This Code of Good Practice recognises that the risk of unforeseen Year 2000-related failures cannot be totally discounted, notwithstanding that all proper steps to rectify possible Year 2000 problems may have been taken. It is vital, therefore, that ship operators, port authority and terminal operators identify and put in place operational contingency plans to ensure that safety is not compromised in the event of an unforeseen Year 2000 equipment or system malfunction. The Code acknowledges the need to exchange information and assurances relating to the measures and precautions taken by shipping companies and ports, respectively, if navigation and port operations are to continue during Year 2000 critical periods.

Elements of the Code of Good Practice

5 The Code recommends measures whereby those responsible for ship, port and terminal operations can reduce the risks associated with the possible malfunction of equipment incorporating "embedded systems", as well as computer equipment, which may be dependent on electronic date recognition. It stresses the importance of:

- the shipmaster's freedom to use his professional judgement in accordance with SOLAS regulation V/10-1*

---

* **SOLAS Chapter V (Safety of Navigation), regulation 10-1:**
Master's discretion for safe navigation
The master shall not be constrained by the shipowner, charterer or any other person from taking any decision which, in the professional judgement of the master, is necessary for safe navigation, in particular in severe weather and in heavy seas.

- the shipowner's master's, port authority's and terminal operator's respective responsibilities for safety and the environment;

- compliance with rules and recommendations covering such matters as passage planning, maintaining appropriate margins of safety in case of breakdown, and prompt reporting when so required;

- the exchange of information between involved parties so as to ensure that all concerned are fully informed and that the measures that have been taken are appropriate to the circumstances; and

- the provision of suitable additional training, where appropriate.

6 The Code is not intended to preclude the adoption of other measures by individual shipping companies, port authorities and terminal operators, nor does it relieve those responsible of their duty to use their discretion in light of the many factors which contribute to safety and pollution prevention.

7 It is recommended that, for the duration of any period when there may be date induced uncertainty as to the performance or functionality of computer systems, electronic and electro-mechanical or similar equipment, the following precautions should be adopted:

.1 Sufficient competent personnel should be available on ships and within ports and terminals to monitor and maintain extra vigilance on critical systems and operations, and respond immediately to equipment failures during the Year 2000 critical periods. Furthermore, if it is planned to introduce operational contingency plans in excess of normal practice, it is important that staff are fully trained and exercised in the implementation of such plans.

.2 Prior to entering confined or congested waters and areas where hazards to navigation exist, the master, taking into account the prevailing circumstances and any advice or instructions received, should decide on the appropriate action to be taken to ensure the continued safety of his ship, crew, passengers and cargo, bearing in mind that not only the ship, but other ships in the vicinity, could lose power, steering or the use of electronic navigation equipment. If the master deems that the safety of the ship is at risk, the master should consider measures to minimize the risk by such means as reducing speed, delaying entry to the port or steering an alternative course.

.3 The port or terminal may obtain information in advance from ship operators in accordance with the questionnaire in Appendix 1. Prior to arrival in or departure from a port or terminal, or before entering port limits, information from authorized personnel should be exchanged by appropriate means between the ship and the port or terminal, as provided for in the questionnaires in Appendices 2 and 3.

.4 Prior to a ship entering or navigating within a port, the port authority or terminal operator should advise the ship of any additional conditions or constraints on navigation or cargo handling that the port authority or terminal operator has decided are necessary in order to minimize the risks associated with any Year 2000 equipment malfunction. Such measures might include minimum separation between ships, speed constraints, the use of tugs, loading/discharge restrictions, etc.

.5 If, after exchanging information, and prior to commencing cargo handling or bunkering operations, there is doubt whether the planned operation can be conducted safely, and without hazard to the environment, property or personnel, the master, port authority or terminal operator should within their respective scope of responsibility, postpone or suspend the operation until the risk of Year 2000 equipment malfunction has passed.

.6 Following a Year 2000 critical period, all equipment not used during that period, and potentially affected by electronic date recognition problems, should be tested to ensure that its performance has not been adversely affected.

APPENDIX 1

YEAR 2000 QUESTIONNAIRE 1

From: (Port Authority/Terminal Operator) _____

Name: _____ **Position:** _____

To: (Name of Ship Operating Company) _____

Please answer the following question if your company anticipates that a ship or ships operated by the company is expected to arrive at, operate in, or depart the above port during a period when there might be date induced uncertainty as to the performance or functionality of computer systems, electronic and electro-mechanical or similar equipment.

Person responsible for Year 2000 Policy, **Name:** _____
Position: _____
Contact Address: _____
_____

Ship Name(s)/IMO No(s): **1.** _____
2. _____
3. _____

Ship Type(s): **1.** _____
2. _____
3. _____

	Delete as appropriate	
1) Does your company have a documented Year 2000 policy in place?	**YES**	**NO**
2) Have inventory checks for each ship been carried out to identify and categorize potentially non-compliant equipment?	**YES**	**NO**
3) Has equipment critical to the operational safety of the ship(s) been investigated, and have appropriate remedial actions been carried out with regard to:		
- Navigational Systems?	**YES**	**NO**
- Propulsion and Power Generation Systems?	**YES**	**NO**
- Cargo Handling Equipment?	**YES**	**NO**
- Other Safety Equipment?	**YES**	**NO**
4) Are records of Year 2000 compliance, and/or the results of equipment tests/investigations, documented and available for inspection by the Port Authority/Terminal Operator?	**YES**	**NO**
5) Does each ship have a documented Year 2000 specific contingency plan?	**YES**	**NO**
6) Has each ship's Year 2000 contingency plan been tested and reviewed to confirm its effectiveness?	**YES**	**NO**

Signature (on behalf of the ship operating company): _____
Date: _____

APPENDIX 2

YEAR 2000 QUESTIONNAIRE 2

From: (Port Authority/Terminal Operator) _____
To: (Name of Ships) _____

Please answer the following as fully as you can. Your response to this questionnaire will assist the Port Authority/Terminal Operator in deciding whether due care has been exercised in avoiding possible equipment failure caused by Year 2000 electronic date recognition problems, and in putting in place contingency plans to cope with unforeseen failures.

Company: _____
Ship's IMO Number: _____ **Flag:** _____
Tonnage (gross): _____ **Ship Type (e.g. ro-ro, cargo):** _____
Date/time of expected arrival/departure: _____

	Delete as appropriate	
1) Does your company have a documented Year 2000 policy in place?	**YES**	**NO**
2) Has an inventory check to identify and categorize potentially non-compliant equipment been carried out?	**YES**	**NO**
3) Has equipment critical to the operational safety of the ship(s) been investigated, and have appropriate remedial actions been carried out with regard to:		
- Navigational Systems?	**YES**	**NO**
- Propulsion and Power Generation Systems?	**YES**	**NO**
- Cargo Handling Equipment?	**YES**	**NO**
- Other Safety Equipment?	**YES**	**NO**
4) Are records of Year 2000 compliance, and/or the results of equipment tests/investigations documented?	**YES**	**NO**
5) Are the above documents available onboard the ship for inspection by the port authority/terminal operator?	**YES**	**NO**
6) Does the ship have a documented Year 2000 specific contingency plan, including competent personnel to implement it?	**YES**	**NO**
7) Has the ship's Year 2000 contingency plan been tested and reviewed to confirm its effectiveness?	**YES**	**NO**
8) Has the ship's equipment not currently in use, but critical to safe operation of the ship, been checked to establish that its functionality has not been affected?	**YES**	**NO**
9) Has all necessary information been exchanged and agreed with the above named port/terminal on any additional Year 2000 specific requirements applicable to ship operations in the port?	**YES**	**NO**

Name of the Master: _____
Signature of the Master: _____
Date: _____

APPENDIX 3

YEAR 2000 QUESTIONNAIRE 3

From: (Ship/Shipping Company) _____

To: (Port Authority/Terminal Operator) _____

Date/time of expected arrival/departure: _____

It is anticipated that the above ship will/may require to navigate or handle cargo within your port on or around the above dates. Please complete the following questions concerning the Year 2000 preparations made by the Port Authority/Terminal Operator.

	Delete as appropriate	
1) Does the Port Authority/Terminal Operator have a documented Year 2000 policy in place?	**YES**	**NO**
2) Has an inventory check to identify and categorize non-compliant equipment been carried out?	**YES**	**NO**
3) Has all equipment critical to the safety of navigation/cargo handling been assessed for Year 2000 compliance?	**YES**	**NO**
4) Has the Port Authority/Terminal Operator investigated potential problems and solutions?	**YES**	**NO**
5) Where non-compliant equipment has not been replaced or upgraded have alternative systems or manual operations been established?	**YES**	**NO**
6) Has the Port Authority/Terminal Operator sought to establish whether its critical suppliers, utilities and external services are Year 2000 compliant?	**YES**	**NO**
7) Is there serious doubt as to the availability of any supply, utility or service which is critical to safety?	**YES**	**NO**
8) Does the Port Authority/Terminal Operator have operational contingency plans in place to cope with unforeseen Year 2000 equipment malfunctions?	**YES**	**NO**
9) Have these contingency plans been tested and reviewed to confirm their effectiveness?	**YES**	**NO**
10) Has all necessary information been exchanged and agreed with the ship/shipping company on any additional Year 2000 specific requirements applicable to port/terminal operations?	**YES**	**NO**

Name: _____
Position: _____
Contact Address: _____
_____

Signature: _____
Date: _____

***

ANNEX 2

KEY ELEMENTS OF Y2K CONTINGENCY PLANS FOR SHIPS, PORTS AND TERMINALS

1 Specific Y2K contingency plans for ships, ports and terminals are necessary, as the chance of successfully finding and fixing all "Year 2000" problems is small. Furthermore, others within the transportation infrastructure could let you down.

2 This is a short guide aimed at assisting those in the marine transportation industry to understand the elements of Year 2000 Contingency Planning which may supplement/complement existing emergency response plans.

3 The following are examples of some specific Year 2000 factors that could be taken into account when drawing up Year 2000 contingency plans:

- Year 2000 failures may result in multiple/simultaneous failures of ships and port systems;
- Year 2000 specific training should be integrated into existing incident training structures;
- familiarization with and check of all manual control operations should increase; and
- all user operations/instruction manuals should be available and up to date.

4 The above are in addition to more general points that need to be considered when addressing contingency plans such as:

- **Identification of equipment**. Identify equipment, systems and systems integration which could be critically affected by Y2K (examples are attached in Appendices 1 and 2). The lists contained in the Appendices are not exhaustive and consideration should be given to the individual requirements of the specific ship, port or terminal.
- **Description of "failure scenarios"**. For each critical system, a "failure scenario" should be described. "Failure scenarios" should include when a failure is most likely to occur and the duration of the possible failure period.
- **An evaluation of risk**. Within risk one should cover the PROBABILITY an event will occur and the IMPACT, in terms of safety and business continuity, it may have on the port/terminal or vessel. At a minimum, IMPACT should be delineated into three categories. Example definitions follow:
  - **High Risk** - Failure of a high-risk item could cause loss of life, loss of ship, a collision or grounding, a major pollution incident, closure of port facilities or a serious threat to company survival.
  - **Medium Risk** - Failure of a medium risk item could cause delays to operations, commercial penalties or fines.
  - **Low Risk** - Failure of a low risk item could cause extra work and inconvenience.

- **A listing of mitigation options**. These are preventive actions that can be taken well in advance of the onset of a failure trigger date to offset or mitigate the effects of the failure. The chosen mitigation option should include the accepted risk that remains after it has been implemented.

- **A listing of contingency options**. Contingency options are strategies for responding to failure scenarios. It is anticipated that recovery procedures will already be in place for equipment, systems and system integration to address operational recovery from minor process failures up to complete critical system failure. However, these procedures should be reviewed and supplemented as required in light of the Year 2000 problem.

APPENDIX 1

EXAMPLES OF POSSIBLE CRITICAL SYSTEMS FOR PORTS AND TERMINALS

Cargo Management
- Loading/Unloading
- Inspection
- Cargo Storage
- Customs and Other Agencies
- Tracking
- Warehouses

Passenger and Crew Services
- People Embarkation/Disembarkation
- Vehicle Embarkation/Disembarkation
- Immigration Controls
- Ferry Services

Customs

Waste Disposal

Ship Repairs

Waterway and Port Management
- Aids to Navigation
- Pilotage and Tug Service
- Port Management
- Waterways Management
- Bridges
- VTS

Leisure
- Retail
- Marinas

Power Supply and Generation
- Supply
- Production
- Maintenance and Repair

Security

Health and Safety
- Fire Protection
- Pest Control/Quarantine
- Clean Water

Environment
- Pollution Prevention
- Bunkering

Site Access
- Rail
- Road
- Air
- Foot

Business Activities and Processes
- Office Functions

Asset Management
- Buildings
- Vehicles and Handling Equipment
- Maintenance

Financial Systems

Communications Systems
- External
- Internal

APPENDIX 2

EXAMPLES OF POSSIBLE CRITICAL SYSTEMS FOR SHIPS

Navigation

- Position
- Steering
- Manoeuvring

Propulsion and Utilities

- Engine control and Monitoring
- Electrical Power Generation
- Emergency Power Generation

Safety

- Fire Protection
- Gas Detection
- Flooding Control
- Position Warning
- Lifesaving Appliances

Cargo Management

- Load/Unload
- Monitoring

Maintenance and Repair

Communications

- External
- Internal

Environment

- Pollution Prevention
- Bunkering

Crew and Passenger Services

- Catering
- Domestic
- Leisure
- Hygiene
- Environment
- Medical
- Passenger Lifts
- Security

Business Services

- Office Services
- Stores
- Client Services